

December 2, 2016

Eric Mar, Chair of the Board  
Jack Broadbent, Executive Director  
John Gioia, Stationary Source Committee Chair  
Members of the Board of Directors  
Bay Area Air Quality Management District  
375 Beale Street, Suite 600  
San Francisco, California 94105

**Re: Health and Safety Commentary Pertaining to Rule 12-16 and 11-18**

Dear Chair Mar, Executive Director Broadbent, Committee Chair Gioia, and Board members,

We are writing as public health and medical professionals and experts to comment on rules under consideration by the Bay Area Air Quality Management District (BAAQMD, Air District) to address harmful emissions of air pollutants. We particularly want to convey the importance of Rule 12-16 to the health of Bay Area residents. Air pollutants are an important cause of disease and death in California and the world, presenting an enormous global burden of disease.

At the outset, we want to note that grave potential changes at the Federal level make imperative local, regional, and state actions to ensure clean air for current and future generations. We hope the BAAQMD, other California air quality districts, and the California Air Resources Board will take even greater leadership in actions affecting the future of our planet.

We also understand the Bay Area must anticipate and plan for economic and population growth, with a significant portion assigned to Contra Costa County.<sup>1</sup> Managing growth in a healthy and sustainable way involves altering underlying systems that drive pollution. At a minimum, avoiding increased pollution from any existing sources is critical.

We are looking to the Air District to take on these major challenges to provide healthy air for all in the Bay Area and to lead the way on local actions that reduce releases of greenhouse gases.

We are therefore interested in the Air District's efforts to reduce hazards associated with the Bay Area refineries. We are concerned that Bay Area refineries are shifting to an even heavier, lower quality feedstock derived from tar sands bitumen. We understand that this shift requires changes to the refineries' infrastructure and methods. We understand the Air District is aware the influx of tar sand crudes is under way and recognizes:

The use of lower quality crude at refineries could potentially mean increased emissions of air contaminants such as sulfur containing pollutants from sulfur recovery facilities. Emissions could also increase as a result of accidents related to the increased corrosiveness of lower quality crudes. Processing lower quality crudes also requires more intense processing and higher energy requirements, which can result in increased air emissions.<sup>2</sup>

To address these health threats, this letter comments on two proposals under the Air District's review, one to address potential increases in criteria pollutant and greenhouse

gas emissions at the refineries and the other to reduce emissions of toxic air contaminants at sources throughout the Bay Area.

The first, Regulation 12, Rule 16, would limit emissions to current levels through enforceable numeric limits on refinery-wide emissions of greenhouse gases (GHG) and particulate matter, thereby preventing increases in emissions of criteria air pollutants and greenhouse gases from Bay Area refineries. By extension, it would reduce pet coke and diesel-related exposures, since pet coke is a major byproduct of dirtier feedstock and since import/export transit will increase with an influx of tar sands. These increases would occur if the refineries processed the dirtier forms of crude oil.

Rule 12-16 would play an important role in avoiding further impairment or degradation of Bay Area air quality from the refineries. The rule would reduce the regional burden of pollution, which will produce health and safety benefits, especially for those proximate to or working in the refineries.<sup>3</sup> It presents the opportunity to avoid increases in net GHG emissions and is in keeping with California's climate change mandate, whereas tar sands refining will clearly impede California from meeting GHG reduction targets.<sup>4</sup>

The Air District is also proposing Regulation 11, Rule 18 to reduce risks from emissions of toxic air contaminants at a wide array of sources in the Bay Area including but not limited to the refineries. Rule 11-18 would broaden the sources for which risks are assessed, set a more protective standard for risks of toxic air contaminants, and incorporate updated toxicity values issued by the Office of Environmental Health Hazard Assessment of the California Environmental Protection Agency (EPA). These are important issues, and with improvements such as tightening the monitoring-to-response timeframe, Rule 11-18 could be an important health effort.

**We urge the Air District to go forth with the next step of review for both rules, but to consider them *separately*. They are complementary but fundamentally different, and they address different pollutants. Both can be justified on health grounds.**

Below is further elaboration that speaks to the importance of Rule 12-16:

**1. Tar sands (bitumen) air emissions will be much greater than those involving current oil feedstock** and will carry disproportionately more GHG, particulate matter including sulfates and heavy metals, and sulfur dioxide.<sup>5</sup> Tar sand refining is also more corrosive and presents disproportionately high occupational hazards.

**2. A particularly important direct consequence of tar sand refining in the Bay Area may be the resulting increase in emissions and exposure to particulate matter (PM)** including PM10, PM2.5, and ultrafine particles (ultrafines, UF). As stated by the Air District, "... PM [Particulate Matter] is still by far the air pollutant most harmful to public health in the Bay Area," accounting for 90% of air pollution-related deaths here.<sup>6</sup> The refining of heavier crudes will increase particulate and sulfur dioxide (a PM precursor) concentrations significantly more than refining of traditional crude oils. Moreover, PM from heavy crudes, particularly tar sands (bitumen), will be more toxic, carrying much more of the highly dangerous heavy metals and elements such as vanadium, nickel, and lead.<sup>7</sup>

**3. Decades of research have firmly established that exposure to particulate matter is associated with severe health effects,** including premature mortality, cardiovascular and pulmonary disease, heart attacks, strokes, and cancer.<sup>8</sup> For example, the U.S. EPA and the World Health Organization (WHO) find that a 1 µg/m<sup>3</sup> increase in PM2.5 is associated with a 1.6% increase in death from cardiovascular disease,<sup>9</sup> and emerging research suggests that UFs pose at least as great a risk for morbidity and mortality as does PM2.5.<sup>10</sup> Physical, neurological, and cognitive adverse effects of air pollution on infants and children have been established, with significant, long-term implications for the individual, their family, and society.<sup>11</sup> Infants and children, the elderly, and those socio-economically disadvantaged, especially those closest to the refineries, are at greatest risk of exposure and are more susceptible to adverse effects of exposure.<sup>12</sup> Poorer communities, largely of color, are both closest in proximity to Bay Area refineries and disproportionately vulnerable to their adverse effects, making an influx of tar sands an environmental justice violation.

**4. There are no safe levels of these air pollutants, and every incremental increase of emissions from tar sand refining will increase adverse health outcomes.** Bay Area air quality is impaired and in nonattainment for ambient standards for ozone, PM10, and PM2.5<sup>13</sup> (harmful ultrafines are essentially unregulated). While attainment standards are a strategy for advancing health, the California EPA, the U.S. EPA and the WHO all clearly state that the standards do not represent safe levels for exposure to air pollution and its constituents.<sup>14</sup> Moreover, they document that important health effects occur below the existing ambient standards. Therefore, Bay Area residents are already burdened and experiencing excess health consequences from air pollution and any increase in emissions will increase adverse health outcomes.

**5. Disproportionately large increases in greenhouse gases emissions will contribute to serious health hazards posed by climate change.** The U.S. EPA, under The Clean Air Act, issued an endangerment finding in 2009, concluding that GHG, "... endanger both the public health and the public welfare of current and future generations."<sup>15</sup> GHG-associated climate change already endangers health in the Bay Area, with increased risks anticipated in the near future.<sup>16</sup> Very few years are left to reduce GHG emissions and avoid the most severe health consequences.

**6. A cap-and-trade alternative to Rule 12-16 would not protect health in the Bay Area.** By failing to abate local increases in particulate matter, its toxic constituents, diesel particulate matter, pet coke, and worksite hazards, increasing tar sand pollution in the Bay Area in exchange for potential GHG reductions elsewhere would fail to protect the health of Bay Area residents – especially proximate communities and workers. Assembly Bill 32 (AB32) requires consideration of communities already adversely impacted by air pollution, prohibits measures that place disproportionate burdens on vulnerable communities, and limits market-based mechanisms to those that do not increase toxic air contaminants or criteria air pollutants.<sup>17</sup>

**In conclusion,** the Air District's own mission, as well as the legislative intent of CEQA and AB32, empower and call upon you to protect the health and air of the Bay Area.<sup>18</sup> We respectfully submit that limiting refinery emissions as outlined in Rule 12-16 is an appropriate course of action. We ask that Rule 12-16 be fairly considered in the upcoming review process, and ultimately adopted.

Thank you for your consideration.

Signed,

Bart Ostro PHD	Former Chief of Air Pollution Epidemiology Section, California EPA, currently Research Faculty, Air Quality Research Center, UC Davis
Amy D. Kyle PhD, MPH	School of Public Health, University of California Berkeley (Institution for identification only)
Claire V. Broome, MD	Adjunct Professor, Rollins School of Public Health Emory University Assistant Surgeon General, US Public Health Service (retired)
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Center for  
**Climate Change & Health**

**Cc:** Victor Douglas

*Endnotes present a sample of the sources supporting this letter.*

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<sup>1</sup> Association of Bay Area Governments. Regional Housing Need Plan for the San Francisco Bay Area: 2014-2022. 2013. Available at: <http://abag.ca.gov/planning/housingneeds/> (Accessed Nov 28, 2016).

<sup>2</sup> Bay Area Air Quality Management District. 2012. Regulatory Concept Paper: Petroleum Refining Emissions Tracking Rule. Draft: October 15.

<sup>3</sup> See for example, Currie J, Heep Ray S, Neidell M. 2011. Quasi-Experimental Studies Suggest That Lowering Air Pollution Levels Benefits Infants' And Children's Health. *Health Affairs* 30, no.12 (2011):2391-2399. doi: 10.1377/hlthaff.2011.0212; Pope AC, Ezzati M, Dockery DW. 2009. Fine Particulate Air Pollution and Life Expectancy in the United States, *New England Journal of Medicine*, January 22 ; BAAQMD. 2011. Health Impact Analysis of Fine Particulate Matter In the San Francisco Bay Area.

<sup>4</sup> BAAQMD. 2016 Clean Air Plan and Regional Climate Protection Strategy, Energy Fact Sheet. Available at: <http://www.baaqmd.gov/~media/files/planning-and-research/plans/clean-air-plan-update/energy-fact-sheet-pdf.pdf?la=en>

<sup>5</sup> Gordon D, Brandt A, Bergerson J, Koomey J. 2015. Know Your Oil: Creating a Global Oil-Climate Index. Carnegie Endowment for International Peace March 11.

[http://carnegieendowment.org/files/know\\_your\\_oil.pdf](http://carnegieendowment.org/files/know_your_oil.pdf) Stockman L. 2013. Petroleum Coke: The coal hiding in the Tar Sands. OilChange International. January .

<sup>6</sup> BAAQMD. 2012. (cited above).

<sup>7</sup> Meyer RF, Attanasi ED, Freeman PA. 2007. Heavy Oil and Natural Bitumen Resources in Geological Basins of the World. Open File-Report 2007-1084 U.S. Geological Survey. Table 1 on page 14 indicates that bitumen crude has 5 – 21 times higher concentration of these heavy metals and 11 times greater sulfur than conventional oil

<sup>8</sup> See for example, U.S. Environmental Protection Agency (U.S. EPA). 2009. Integrated Science Assessment for Particulate Matter (Final Report) EPA/600/R-08/139F.; WHO (2003). *Health Aspects of Air Pollution with Particulate Matter, Ozone and Nitrogen Dioxide.*; See also Brook RD, et. al. 2010. Particulate Matter Air Pollution and Cardiovascular Disease An Update to the Scientific Statement From the American Heart Association. *Circulation* 121, 2331–2378.; Ostro, B., Broadwin, R., Green, S., Feng, W.-Y., and Lipsett, M. (2006). Fine Particulate Air Pollution and Mortality in Nine California Counties: Results from CALFINE. *Environ. Health Perspect.* 114, 29–33.

<sup>9</sup> Hoek G et al. 2013. Long-term air pollution exposure and cardio-respiratory mortality: a review. *Environmental Health*, 12:43. ; USEPA 2009 (cited above).

<sup>10</sup> Ostro B, Hu J, Goldberg D, Reynolds P, Hertz A,3 Bernstein L, Kleeman M. 2016. Associations of Mortality with Long-Term Exposures to Fine and Ultrafine Particles, Species and Sources: Results from the California Teachers Study Cohort. *Environmental Health Perspectives*. June 123(6) pp 549-556.

<sup>11</sup> See for example, Fleischer et al. 2014. Outdoor Air Pollution, Preterm Birth, and Low Birth Weight: Analysis of the World Health Organization Global Survey on Maternal and Perinatal Health. *Environmental Health Perspectives* 122:425–430.

<sup>12</sup> See for example Bell et al. 2013. Evidence on vulnerability and susceptibility to health risks associated with short-term exposure to particulate matter: a systematic review and meta-analysis. *American Journal of Epidemiology* 178:865-876. ; Brody et al. 2009. Linking Exposure Assessment Science with Policy Objectives for Environmental Justice and Breast Cancer Advocacy: The Northern California Household Exposure Study. *American Journal of Public Health* 99(S3): S600– S609. DOI: 10.2105/AJPH.2008.149088 ; Morello-Frosch R, Zuk M, Jerrett M, Shamasunder B, Kyle AD. 2011. Understanding The Cumulative Impacts Of Inequalities In Environmental Health: Implications For Policy. *Health Affairs* 30: 879–887. ; Millet M, Tran S, Eatherton M, Flattery J, Kreutzer R. 2007. The Burden of Asthma in California: A Surveillance Report. Richmond, CA: California Dept of Health Services, Environmental Health Investigations Branch. ; Clark-Reyna SE, Grineski SE Collins TW. (2016) Health Status and Residential Exposure to Air Toxics. *Family & Community Health* 39:3160-168. Online publication date: 1-Jan-2016. .

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<sup>13</sup> BAAQMD. Air Quality Standards and Attainment Status. Accessed on the internet on November 23, 2016 at: <http://www.baaqmd.gov/research-and-data/air-quality-standards-and-attainment-status>

<sup>14</sup> U.S. EPA 2009. (cited above); WHO. 2005. WHO Air quality guidelines for particulate matter, ozone, nitrogen dioxide and sulfur dioxide Global update 2005 Summary of risk assessment.; California Air Resources Board and Office of Environmental Health Hazard Assessment. 2002. Staff Report: Public Hearing to Consider Amendments to the Ambient Air Quality Standards for Particulate Matter and Sulfates. May 3.

<sup>15</sup> US EPA. 2009. Endangerment and Cause or Contribute Findings for Greenhouse Gases under the Section 202(a) of the Clean Air Act. Accessed November 27 2016 at: <https://www.federalregister.gov/documents/2009/12/15/E9-29537/endangerment-and-cause-or-contribute-findings-for-greenhouse-gases-under-section-202a-of-the-clean>

<sup>16</sup> Current, imminent, mid and long-term health impacts of climate change in the Bay Area include premature mortality, cardiovascular and respiratory disease, asthma and allergies, vector-borne and water-borne illness, traumatic injury and death. See for example: USGCRP. 2016: The Impacts of Climate Change on Human Health in the United States: A Scientific Assessment.; East Bay Municipal Utility District (EBMUD). 2014 Climate Change Monitoring and Response Plan 2014.; Liu JC, Pereira G, Uhl SA, Bravo MA, Bell BM. 2015. A systematic review of the physical health impacts from non-occupational exposure to wildfire smoke. Environ Res. January; 120–132. doi: 10.1016/j.envres.2014.10.015 β ; Ostro BD, Roth LA, Green RS, Basu R. 2009. Estimating the mortality effect of the July 2006 California heat wave. Environmental Research 109: 614–619.

<sup>17</sup> See for example Nuñez F. California Global Warming Solutions Act of 2006. Assembly Bill 32. ; Health and Safety Code section 38562(b)(2) Cushing LJ, Wander M, Morello-Frosch R, Pastor M, Zhu A, Sadd J. 2016. A Preliminary Environmental Equity Assessment of California’s Cap-and-Trade Program. USC Program for Environmental and Regional Equity (PERE).

<sup>18</sup> <http://www.baaqmd.gov/about-the-air-district/mission-statement>’;  
[http://resources.ca.gov/ceqa/docs/2014\\_CEQA\\_Statutes\\_and\\_Guidelines.pdf](http://resources.ca.gov/ceqa/docs/2014_CEQA_Statutes_and_Guidelines.pdf);  
<http://www.arb.ca.gov/cc/docs/AB132text.pdf>